Attachment #1

ERNEST KENNEY
EUGENE MAR
RICHARD E. FICHTER
THOMAS J. MOORE
ERIC S. SPECTOR
FELIX J. D'AMBROSIO
GEORGE A. LOUD
BENJAMIN E. URCIA*
JUSTIN J. CASSELL
JOHN R. SCHAEFER
SCOTT A. BRAIRTON
PATRICK M. BUECHNER

GEORGE CHUNG CHIN CHEN‡

* BAR OTHER THAN VA.
‡ REG. PATENT AGENT

LAW OFFICES
BACON & THOMAS, PLLC
625 SLATERS LANE - FOURTH FLOOR
ALEXANDRIA, VIRGINIA 22314-1176
U.S.A.

TELEPHONE
(703) 683-0500

FACSIMILE
(703) 683-1080
(703) 683-0884

E-Mail
mail@baconthomas.com

OIPE JAN 16 2008 PATENT & TRADEMARK OFFICE

FACSIMILE COMMUNICATION

To: Examiner Nguyen

Fax #: 571 273-8020

Re: USSN 10/509,752

From: George Loud

Total pages: 1

Date: 11-16-2007`

Message:
Mr. Nguyen:
Further to our telephone conversation of earlier today, the following is an outline of the topics I want to cover in a telphone interview.

1. The product claims here (claims 1-11 and 19-25) use the language "mixed conductor in the form of a single material" which language was relied upon in prosecution leading to US 7,160,837 (basis for the double patenting here) to overcome the same prior art rejections as here, including that over Vanderborgh. Indeed, the claims here use the same wording as those issued in 7,160,837 with a further, narrowing limitation. Vanderborgh et al disclose electrodes formed of two different, mixed solid phases, e. g. in the form of a dispersion of the electron conductor (carbon or metal particles) in a matrix of the ion exchange polymer (e.g. column 9, lines 10-20), in the form of a mixture of different two different fibers (col. 10, lines 24-30) or in the form of a "conductive graphitized cloth containing a relatively high amount of unhydrolized ion exchange resin" (column 10, lines 58+). In contradistinction, the present invention is a homogeneous, single phase material. Accordingly, the first topic of discussion should be the adequacy of the claim language in terms of making the foregoing distinction.

2. How are dependent claims 9, 20 and 22 (reciting covalent bonding between the electron and proton conductors) and dependent claims 23-15 (reciting a polymeric molecular structure as exemplified in Figs. 1, 2 and 4) seen as anticipated by Vanderborgh? The final does not treat these dependent claims.

3. All method claims here recite polymerizing a hydrocarbon. The polymeric precursors taught at column 7, lines 34-47 of Chen et al are not hydrocarbons.

4. Method claim 12 and the claims dependent thereon recite "mixing and polymerizing ... [a hydrocarbon] ... " with a proton conducting material." (Compare method claim 13) In contrast, Chen et al polymerize their chelating agent first and then add the ion conductor in powder form.

Please review and telephone me at 703 683-0500 to arrange a telephone interview.
G. Loud

G Loud

HASE3004.FAXtoEx.11-16-07.wpd

(06Jan04)

Attachment #2

OIPE
JAN 16 2008
IAP87
PATENT & TRADEMARK OFFICE

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Fax Cover Sheet

JAN 2008
Received
Dixon & Thomas

Date: 09 Jan 2008

To: Mr. George Loud	**From:** Khanh T. Nguyen
Application/Control Number: 10/509,752	**Art Unit:** 1796
Fax No.: (703) 683-1080	**Phone No.:** (571) 272-8082
Voice No.: (703) 683-0500	**Return Fax No.:** (571) 273-8300
Re:	**CC:**

☐ **Urgent** ☒ **For Review** ☐ **For Comment** ☐ **For Reply** ☐ **Per Your Request**

Comments:
Attn: Mr. Loud

Per our discussion, here are the suggested amendment to application No. 10/509,752.

Number of pages 7 including this page

Suggested Amendment: 10/509,752

1. (Currently amended) A mixed conductor in the form of a single material ~~comprising characterized by being a compound of an~~ formed by pyrolysis of a mixture comprising an organic precursor and a proton conductor phase of inorganic electron conductor portions made of carbonaceous material and inorganic proton conductor portions ~~of an inorganic material~~, said inorganic electron conductor and inorganic proton conductor portions being fixed together by at least one of covalent bonding, intercalation and inclusion, said mixed conductor exhibiting both electron and proton conduction at a temperature below 200° C.

2. (Previously presented) The mixed conductor according to claim 1, wherein said electron conductors are is obtained by carbonizing at least one member selected from the group consisting of aliphatic hydrocarbons, aromatic hydrocarbons and derivatives thereof ~~of the aliphatic hydrocarbon and the aromatic~~.

3. (Previously presented) The mixed conductor according to claim 2, wherein ~~each of~~ said ~~aliphatic hydrocarbon, aromatic hydorcarbon and derivatives of the aliphatic hydrocarbon and the aromatic hydrocarbon contains~~ at least one member is selected from the ~~a~~ group consisting of polyacetylene, resorcinol, phenol, phenylphenol, polyaniline, polypyrrole, polythiophene, phenylphosphoric acid, phenylsilane alkoxide, pyrogallol, and dihydroxybiphenyl.

4. (Canceled)

Suggested Amendment: 10/509,752

5. (Previously presented) The mixed conductor according to claim 1, wherein said proton conductor portions contain ~~contains~~ at least one member selected from the ~~a~~ phosphorus-containing compounds, ~~a~~ sulfur-containing compounds, carboxylic acids, boric acid and inorganic solid-state acids.

6. (Previously presented) The mixed conductor according to claim 1, wherein said electron conductor portions have ~~conductor has~~ consecutive carbon-carbon bonds including a carbon-carbon double bond.

7. (Previously presented) The mixed conductor according to claim 1, wherein said mixed conductor supports a noble metal catalyst.

8. (Currently amended) A mixed conductor in the form of a single material by pyrolysis comprising ~~wherein~~ an inorganic electron conductor portions made of carbonaceous material obtained by carbonizing ~~an organic~~ said material ~~is fixed~~ and inorganic ~~a~~ proton conductor portions, said inorganic electron conductor and inorganic proton conductor portions being fixed together by at least one of covalent bonding, intercalation and inclusion, said mixed conductor exhibiting both electron and proton conduction at a temperature below 200° C.

9. (Previously presented) The mixed conductor according to claim 8, wherein the electron conductors are ~~conductor is~~ fixed to the proton conductors by a covalent bond.

Suggested Amendment: 10/509,752

10. (Previously presented) The mixed conductor according to claim 8, wherein the electron conductors are ~~conductor is~~ fixed to the proton conductors by intercalation.

11. (Previously presented) The mixed conductor according to claim 8, wherein the electron conductors are ~~conductor is~~ fixed to the proton conductors by inclusion.

12. (Previously presented) A method of producing a mixed conductor comprising: a first step of obtaining a high molecular weight precursor by mixing and polymerizing at least one member selected from the ~~a~~ group consisting of aliphatic hydrocarbon, aromatic hydrocarbon and derivatives thereof ~~of the aliphatic hydrocarbon and the aromatic hydrocarbon~~ with a proton conducting material; and a second step of burning the high molecular weight precursor, obtained in the first step, in ~~under~~ an inert atmosphere.

13. (Previously presented) A method of producing a mixed conductor comprising: a first step of ~~obtaining a high molecular precursor by mixing and~~ polymerizing at least one member selected from the ~~a~~ group consisting of aliphatic hydrocarbons, aromatic hydrocarbons and derivatives thereof ~~of the aliphatic hydrocarbon and the aromatic hydrocarbon~~; ~~and~~ a second step of mixing a proton conducting material with the polymerized member to obtain a high molecular weight precursor ~~into said at least one upon polymerization thereof~~ ; and a third ~~second~~ step of burning the high molecular weight precursor obtained in the first step in under an inert atmosphere to convert the polymerized member to electron conducting portions.

Suggested Amendment: 10/509,752

14. (Currently amended) A mixed conductor producing method wherein an organic compound is bound or mixed with a compound having ~~movable protons~~ proton conduction to obtain a high polymer precursor, and said high polymer precursor is carbonized to thereby impart electron conduction to the precursor.

15. (Previously presented) The mixed conductor producing method according to claim 12, wherein ~~each of~~ said at least one member is selected from the ~~a~~ group consisting ~~of aliphatic hydrocarbon, aromatic hydrocarbon and derivatives of the aliphatic hydrocarbon and the aromatic hydrocarbon is at least one selected from a group consisting~~ of polyacetylene, resorcinol, phenol, phenylphenol, polyaniline, polypyrrole, polythiophene, phenylphosphoric acid, phenylsilane alkoxide, pyrogallol, and dihydroxybiphenyl. of

16. (Previously presented) The mixed conductor producing method according to claim 12, wherein said proton conducting material is ~~conductor contains~~ at least one member selected from the ~~a~~ group consisting of ~~a~~ phosphorus-containing compounds, ~~a~~ sulfur-containing compounds, carboxylic acids, boric acid, and inorganic solid-state acids.

17. (Previously presented) The mixed conductor producing method according to claim 12, comprising a third step of supporting a noble metal catalyst on ~~causing~~ the product burned in said second step ~~to support a noble metal catalyst~~.

Suggested Amendment: 10/509,752

18. (Previously presented) The mixed conductor producing method according to claim 12, wherein the first step comprises heating the high molecular precursor or heating the high molecular precursor under a pressurized condition.

19. (Previously presented) The mixed conductor according to claim 1 exhibiting both electron and proton conduction at temperatures within a range of from room temperature to 60° C.

20. (Previously presented) The mixed conductor according to claim 1 wherein said electron and proton conductor portions are covalently bound in a single polymeric molecular structure.

21. (Previously presented) The mixed conductor according to claim 8 exhibiting both electron and proton conduction at temperatures within a range of from room temperature to 60° C.

22. (Previously presented) The mixed conductor according to claim 8 wherein said electron and proton conductor portions are covalently bound in a single polymeric molecule structure.

23. (Previously presented) The mixed conductor according to claim 1 wherein the electron conductor portions are carbon skeletons bridged by the proton conductor portions.

Suggested Amendment: 10/509,752

24. (Previously presented) The mixed conductor according to claim 8 wherein the electron conductor portions are carbon skeletons bridged by the proton conductor portions.